APPROVAL TO CONSTRUCT/MODIFY
A STATIONARY SOURCE

In compliance with the provisions of the Clean Air Act, 42 U.S.C.A. §§ 7401-7671q. (West Supp. 1992)(the "Act"), Guam Power Authority is granted approval to construct two 23-MW oil-fired stationary gas combustion turbines at the Dededo Generating Station located in Dededo, Guam, in accordance with the plans submitted with their application and with the Federal regulations governing the Prevention of Significant Deterioration of Air Quality (40 CFR §52.21) and other conditions attached to this document and made a part of this approval.

Failure to comply with any condition or term set forth in this approval will be considered grounds for enforcement action pursuant to Section 113 of the Clean Air Act.

This Approval to Construct/Modify a stationary source grants no relief from the responsibility for compliance with any other applicable provision of 40 CFR Parts 52, 60, and 61 or any applicable Federal, State, or local air quality regulations.

This approval shall become effective 30 days after receipt of the Approval to Construct/Modify by the applicant.

Dated: 4/16/93

Director
Air and Toxics Division

## Permit Conditions

### I. Permit Expiration

This Approval to Construct/Modify shall become invalid if (1) construction is not commenced (as defined in 40 CFR §52.21(b)(8)) within 18 months after the approval takes effect, (2) construction is discontinued for a period of 18 months or more, or (3) construction is not completed within a reasonable time.

### II. Notification of Commencement of Construction and Startup

The U.S. EPA Regional Administrator and the Administrator, Guam Environmental Protection Agency, shall be notified in writing of the anticipated date of initial startup (as defined in 40 CFR §60.2) of combustion gas turbine No. 2 (CT #2) not more than sixty (60) days nor less than thirty (30) days prior to such date and shall be notified in writing of the actual date of commencement of construction and startup within fifteen (15) days after such date.

### III. Facilities Operation

All equipment, facilities, and systems installed or used to achieve compliance with the terms and conditions of this Approval to Construct/Modify shall at all times be maintained in good working order and be operated as efficiently as possible so as to minimize air pollutant emissions.

### IV. Malfunction

The Administrator, Guam Environmental Protection Agency, shall be notified by telephone within 48 hours following any failure of air pollution control equipment, process equipment, or of a process to operate in a normal manner which results in an increase in emissions above any allowable emissions limit stated in Section IX. of these conditions. In addition, the U.S. EPA Regional Administrator shall be notified in writing within fifteen (15) days of any such failure. This notification shall include a description of the malfunctioning equipment or abnormal operation, the date of the initial failure, the period of time over which emissions were increased due to the failure, the cause of the failure, the estimated resultant emissions in excess of those allowed under Section IX of these conditions, and the methods utilized to restore normal operations. Compliance with this malfunction notification provision shall not excuse or otherwise constitute a defense to any violations of this permit or of any law or regulations which such malfunction may cause.

**V. Right to Entry**

The U.S. EPA Regional Administrator, the Administrator of the Guam Environmental Protection Agency, and/or their authorized representatives, upon the presentation of credentials, shall be permitted:

A. to enter upon the premises where the source is located or in which any records are required to be kept under the terms and conditions of this Approval to Construct/Modify; and

B. at reasonable times to have access to and copy any records required to be kept under the terms and conditions of this Approval to Construct/Modify; and

C. to inspect any equipment, operation, or method required in this Approval to Construct/Modify; and

D. to sample emissions from the source.

**VI. Transfer of Ownership**

In the event of any changes in control or ownership of facilities to be constructed or modified, this Approval to Construct/Modify shall be binding on all subsequent owners and operators. The applicant shall notify the succeeding owner and operator of the existence of this Approval to Construct/Modify and its conditions by letter, a copy of which shall be forwarded to the U.S. EPA Regional Administrator and the Administrator of the Guam Environmental Protection Agency.

**VII. Severability**

The provisions of this Approval to Construct/Modify are severable, and, if any provision of this Approval to Construct/Modify is held invalid, the remainder of this Approval to Construct/Modify shall not be affected thereby.

**VIII. Other Applicable Regulations**

The owner and operator of the proposed project shall construct and operate the proposed stationary source in compliance with all other applicable provisions of 40 CFR Parts 52, 60, 61, and all other applicable federal and local air quality regulations.

## IX. Special Conditions

### A. Certification

Guam Power Authority (GPA) shall notify the U.S. EPA (Attn: A-3-3) and Guam EPA in writing of compliance with Special Conditions B., G.1., and J. below, and shall make such notification within 15 days of such compliance. This letter(s) must be signed by a responsible corporate official of GPA.

### B. Air Pollution Control Equipment/Operations

On and after the date of startup (as defined in 40 CFR §60.2) of CT #1/CT #2, GPA shall install, continuously operate, and maintain the following air pollution controls and operations on each combustion turbine (CT) to minimize emissions. The controls and/or operations listed below shall be fully operational upon initial startup of CT #1/CT #2.

1. Each CT shall use water injection to control $NO_x$ emissions. The water injection system shall be in operation whenever the CTs are operating.

2. For each CT, GPA shall, pursuant to 40 CFR §60.334(a), install a continuous monitoring system to monitor and record the fuel consumption and the ratio of water-to-fuel being fired in the CT. The monitoring system shall be in operation whenever either CT is in operation. These systems shall be accurate to within $\pm$5% and shall be approved by U.S. EPA.

3. Failure to operate the water injection system or the fuel and water monitoring system during CT operation shall be considered a violation of the applicable $NO_x$ emission limitation for that CT.

4. Emission limits in this permit are based upon 7760 hours per year of full-load operation and 1000 hours per year of part-load operation of each CT.

    a. Part-load operation of CT #1 or CT #2 shall not exceed 1000 hours per calendar year for each CT.

b. "Full-load" operation is defined as 100% maximum rated capacity of a CT. "Part-load" operation is defined as any operation of a CT at less than 80% of the rated capacity of the CT. In addition, "percentage of load" operation means a percentage of rated capacity. (Example: "50% load" means 50% of rated capacity.)

c. Part-load operation of either CT for more than 1000 hours in any calendar year shall be considered a violation of the applicable CO emission limitation for that CT for each day the CT is operated at part-load beyond the 1000 hour limitation.

d. Upon written request by GPA, EPA may review for revision Special Conditions IX.B.4.a. and c. of this permit. However, such a written request by GPA will not relieve GPA from compliance with these Special Conditions.

**C. Good Air Pollution Control Practice**

At all times, including periods of startup, shutdown, and malfunction, GPA shall, to the extent practicable, maintain and operate the emission units (including associated air pollution control equipment) covered by this Approval to Construct/Modify in a manner consistent with good air pollution control practice for minimizing emissions. Determination of whether acceptable operating and maintenance procedures are being used will be based on information available to the Administrator which may include, but is not limited to, monitoring results, opacity observations, review of operating and maintenance procedures, and inspection of the source.

**D. "Black Start" Generator**

A Cummins 1.2-megawatt (MW) diesel generator provides station power to Dededo and starts one of the two CTs during an island-wide power system (IWPS) failure.

1. The black start generator shall only be used during times of IWPS failure to provide power for the Dededo facility and to start either CT #1 or CT #2.

2. The black start generator shall not be operated when either CT #1 or CT #2 is operating and is providing station power and the black start generator shall not provide power to the IWPS.

3. To keep the black start generator immediately available for use in case of an IWPS failure, the unit may be operated for approximately one hour per week.

**E. Emission Limitations (Each CT)**

1. GPA shall not discharge or cause the discharge into the atmosphere the following pollutants in excess of the specified limits from CT #1 or CT #2:

   a. Opacity: 10%

   b. $PM_{10}$: 19.8 lb/hr

   c. CO: 25 ppmvd (full-load)
   170 ppmvd (50% load)
   21.0 lb/hr (full-load)
   86.0 lb/hr (50% load)

   d. $NO_x$: 59 ppmvd
   83.0 lb/hr (full-load)
   49.0 lb/hr (50% load)

   e. Volatile Organic Compounds* (VOC):

   4.0 lb/hr (full-load)
   14.0 lb/hr (50% load)

   *Expressed as lb/hr methane

   f. $SO_2$: See below

2. $SO_2$ emission limits for the CTs, the black start generator, and the existing diesel generators shall be expressed as percent by weight sulfur content of fuel oil fired. (See Special Condition IX.F.)

3. The $NO_x$ and CO emission limits expressed as ppmvd shall be corrected to 15% $O_2$.

4. Compliance with the lb/hr emission limits specified above will be determined using 3-hour rolling averages.

**F. Fuel Usage and Fuel Sulfur Content**

1. Only No. 2 fuel oil shall be combusted in the CTs, the black start generator, and the four existing diesel generators at the Dededo Generating Facility.

2. The sulfur content of this fuel oil shall not exceed 0.6% by weight.

3. Use of fuel oil that contains sulfur in excess of 0.6% by weight shall be considered a violation of the applicable $SO_2$ emission limit for the units in which this fuel is fired.

4. Fuel oil sulfur content shall be determined pursuant to 40 CFR §§ 60.334(b) and 60.335(d). Failure to determine fuel oil sulfur content (or failure to keep records) shall be considered a violation of the applicable $SO_2$ emission limit for the units in which such fuel oil is fired.

**G. Water Injection Rate**

Water injection shall be used (and the water-to-fuel ratio monitored and recorded) whenever each CT is in operation to control $NO_x$ emissions.

1. Water meters and non-resetting fuel meters must be installed prior to initial operation of CT #1 and CT #2 to record the amount of water injected into and fuel oil burned by each CT. The recording system must meet the requirements of Special Condition IX.B.2. of this permit.

2. The estimated water-to-fuel ratio is 0.53. The actual water-to-fuel ratio (needed to comply with the $NO_x$ emission limits contained in this permit) for each CT shall be determined during initial performance testing.

3. Prior to initial performance testing, the water-to-fuel ratio for each CT shall not fall below 0.53.

4. After initial performance testing, the water-to-fuel ratio for each CT shall not fall below the level determined by the initial performance test. For each CT, the monitoring device specified in Special Condition IX.B.2. of this permit shall be

used to determine the fuel consumption and the water-to-fuel ratio necessary to comply with the $NO_x$ limits contained in this permit and New Source Performance Standards (NSPS) 40 CFR Part 60, Subpart GG, at 30, 50, 75, and 100 percent of peak load or at four points in the normal operating range of the CT, including the minimum point in the range and peak load. For NSPS purposes, all loads must also be corrected to ISO (288 degrees Kelvin, 60 percent relative humidity, 101.3 kilopascals pressure) conditions using the appropriate equations supplied by the CT manufacturer.

5. Operation of either CT at a water-to-fuel ratio below the level specified in Special Condition IX.G. of this permit shall be considered a violation of the applicable $NO_x$ emission limit for that CT.

6. Failure to operate the water-to-fuel ratio monitoring system or failure to record water or fuel flow data whenever either CT is in operation shall be considered a violation of the applicable $NO_x$ emission limit for that CT.

**H. Performance Tests**

1. Within 60 days of achieving rated capacity, but no later than 180 days after the initial startup of each CT (as defined in 40 CFR §60.2) and at such other times as may be specified by U.S. EPA or Guam EPA, GPA shall conduct or cause to be conducted performance tests (as defined in 40 CFR §60.8) for $PM_{10}$, CO, $NO_x$, and VOC on the exhaust stack gases of each CT. GPA shall furnish U.S. EPA (Attn: A-3-3) and Guam EPA a written report of the results of such tests within 30 days of the conclusion of the tests.

2. Performance tests shall be conducted on an annual basis. Upon prior written request and adequate justification from GPA, U.S. EPA may waive a specific annual performance test for each CT. Such request must be submitted (Attn: A-3-3) no later than 60 days prior to the annual performance test date.

3. The performance test report shall define the "normal operating range" of each CT pursuant to 40 CFR §60.335(c)(2).

4. Performance tests shall be conducted at the maximum operating capacity of each CT. In addition, CO performance testing shall also be done at 50% of the maximum rated operating capacity of each CT.

5. GPA shall provide performance testing facilities which meet the requirements of 40 §CFR 60.8(e).

6. U.S. EPA (Attn: A-3-3) shall be notified in writing at least 30 days prior to performance testing for each CT to allow for the development of an approvable performance test plan and to arrange for an observer to be present at the test. Such prior notification shall minimize the possibility of U.S. EPA rejection of the performance test results for procedural deficiencies. In lieu of performance test methods specified in this permit, GPA may use equivalent test methods with prior written approval from U.S. EPA.

7. Performance tests shall be conducted using the following reference methods from 40 CFR Part 60, Appendix A:

   a. For $NO_x$, Method 20.

   b. For CO, Methods 1-4, and Method 10 or 10B.

   c. For opacity, Method 9.

   d. For $PM_{10}$, Methods 1-4 and Method 5 or 5B. (During $PM_{10}$ performance testing, opacity observations shall be conducted by a certified visual emissions observer pursuant to requirements contained in 40 CFR 60.11(b) and 40 CFR Part 60, Appendix A, Reference Method 9.)

   e. For VOC, Methods 1-4 and Method 25A.

**I. Monitoring/Recordkeeping/Reporting**

1. GPA shall maintain a file of all measurements, including continuous monitoring system, monitoring device, and performance testing measurements; all continuous monitoring performance evaluations; all continuous monitoring system or monitoring device calibration checks; adjustments and maintenance performed on these systems or devices; quarterly excess emission reports; fuel usage and fuel sulfur content records; and all other information required by this permit or by NSPS recorded in a permanent form suitable for inspection. This file shall be retained for at least five (5) years following the date of such measurements, maintenance, reports, and records.

2. Prior to the date of startup and thereafter for each CT, GPA shall install, maintain, and operate a continuous monitoring system pursuant to Special Condition IX.B.2. of this permit.

3. GPA shall submit a written report of all excess emissions to U.S. EPA (Attn: A-3-3) for every calendar quarter, postmarked within 30 days of the end of that calendar quarter. The report shall include the following information:

   a. Equations and/or conversion factors used to calculate the water-to-fuel ratio for each CT.

   b. The date and time of commencement and completion of each time period of excess emissions.

   c. Specific identification of each period of excess emissions that occurs during startups, shutdowns, or malfunctions of each CT or water injection system. The nature and cause of any malfunction (if known) and the corrective action taken or preventative measures adopted shall be reported.

   d. The date and time identifying each period during which the continuous monitoring system was inoperative except for calibration checks, and the nature of the system repairs or adjustments.

e. The date and time when either CT, the existing diesel generators, or the black start generator are operated firing fuel oil with a sulfur content which exceeds 0.6% by weight.

f. The number of hours during the quarter when either CT operated at part-load operation as defined by Special Condition IX.B.4.b.

g. The number of hours the black start generator operated during the quarter except as provided for in Special Condition IX.D.3.

h. Chemical analysis reports for all fuel oil shipments received for the Dededo facility for that calendar quarter. (GPA shall also state whether all chemical analyses required by NSPS were performed during the calendar quarter.)

i. When no excess emissions have occurred or the continuous monitoring system has not been inoperative, repaired, or adjusted, such information shall be stated in the report.

j. When the CTs have not been operated at part-load or the black start generator has not been operated, such information shall be stated in the report.

Excess emissions (for $NO_x$ and $SO_2$) shall be defined as any period during which:

1) The water-to-fuel ratio for either CT falls below 0.53 or the levels determined by the initial performance testing.

2) The CTs, the existing diesel generators, or the black start generator are operated while firing a shipment of oil containing a sulfur content of greater than 0.6% by weight.

**J. New Source Performance Standards**

CT #1 and CT #2 are subject to NSPS 40 CFR Part 60, Subpart A (General Provisions), and Subpart GG (Standards of Performance for Stationary Gas Turbines), including all emission limits and all notification, testing, monitoring, and reporting requirements.

**K. Variances**

Variances (or other forms of regulatory relief) issued by Guam EPA do not relieve GPA from compliance with any of the terms and conditions contained in this Approval to Construct/Modify.

**X. Agency Notifications**

All correspondence required by this Approval to Construct/ Modify shall be forwarded to:

A. Director, Air and Toxics Division (Attn: A-3-3)
U.S. Environmental Protection Agency
75 Hawthorne Street
San Francisco, CA 94105

B. Administrator, Air & Land Programs
Guam Environmental Protection Agency
D-107 Harmon Plaza
130 Rojas Street
Harmon, Guam 96911

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

April 16, 1993

In Reply: A-5-1
Refer To: NSR 4-11
GU 92-01

Mr. John M. Benavente
General Manager
Guam Power Authority
P.O. Box 2977
Agana, Guam, USA 96910-2977

Dear Mr. Benavente:

In accordance with the provisions of the Clean Air Act, 42 U.S.C.A. §§ 7401-7671q. (West Supp. 1992)(the "Act"), the Environmental Protection Agency has reviewed the application submitted by Guam Power Authority (GPA) for two 23-MW oil-fired stationary gas combustion turbines to be located at the Dededo Generating Station.

A request for public comment regarding EPA's proposed action on the above application has been published. Enclosed is a copy of EPA's response to significant comments received. After consideration of the expressed views of all interested persons (including local government agencies), and pertinent Federal statutes and regulations, EPA hereby issues the enclosed Approval to Construct/Modify a Stationary Source for the facility described above. This action does not constitute a significant change from the proposed action set forth and offered for public comment.

The Consolidated Permit Regulations (40 CFR Part 124) which were promulgated by the Environmental Protection Agency require that we notify interested parties of the permit issuance and advise them that they may petition the Administrator of the Environmental Protection Agency to review any condition of the permit decision.

The petition shall include a statement of the reasons supporting that review, including a demonstration that any issues being raised were raised during the public comment period to the extent required by these regulations, and when appropriate, a showing that the condition in question is based upon:

(1) A finding of fact or conclusion of law which is clearly erroneous;

(2) An exercise of discretion or an important policy consideration which the Administrator should, in his or her discretion, review.

An appeal to the Administrator for review of the permit decision along with an original and one copy must be filed not later than thirty (30) days from the date the final permit is issued with the Headquarters Hearing Clerk at the following address:

Headquarters Hearing Clerk (A-110)
Room M3708
U.S. Environmental Protection Agency
401 M Street, SW
Washington, DC 20460

This Approval to Construct/Modify shall take effect thirty (30) days from the date it is received by GPA.

If you have any questions regarding this matter, please contact Mark Sims, Enforcement Section, at (415) 744-1175, or Matt Haber, Chief, New Source Section, at (415) 744-1254.

Sincerely,

David P. Howekamp
Director
Air and Toxics Division

Enclosures

cc: R.W. Beck & Associates
(Ms. Peg Young)
Guam Environmental Protection
Agency

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

August 31, 1992

In Reply: A-5-1
Refer To: NSR 4-11
GU 92-01

Mr. John Benavente
General Manager
Guam Power Authority
P.O. Box 2977
Agana, Guam, U.S.A. 96910-2977

Dear Mr. Benavente:

This is in response to your Prevention of Significant Deterioration application for an Environmental Protection Agency Approval to Construct, dated June 5, 1992, and received by this office on June 8, 1992. The application is for Combustion Turbines #1 and #2 at the Dededo Generating Station located in Dededo, Guam.

After our review of the above application, we have determined that it is administratively complete. A preliminary determination, which will include an Ambient Air Quality Impact Report (AAQIR) and draft permit, is being developed. However, it is possible that clarifying information on one or more parts of the application may be required before we can issue a draft permit.

This notification of completeness does not imply that the EPA agrees with any analyses, conclusions, or positions contained in the application. Also, if you should request a suspension in the processing of the application, or submit new information indicating a significant change in the project design, ambient air impacts, or emissions, this determination of completeness may be revised.

Upon issuance of the preliminary determination, we will publish a public notice of our intent to issue the permit. The comment period specified in the notice shall be at least 30 days. Please be advised that at any time anyone may have full access to the application materials and other information you provide to us in connection with this permit action.

This letter is also to inform you of your rights to claim business confidentiality under 40 CFR Part 2, Subpart B, for any part of or all of the information you provide us, and to document for our files that we have done so. If you do not make a claim of confidentiality for any of this material within 15 days of the date you receive this letter you will have waived your right to do so. The facility name and address may not be claimed as confidential.

If you wish to claim confidentiality, you must substantiate your claim. Your substantiation must address the points enumerated in the attachment to this letter, in accordance with 40 CFR 2.204(e).

If you should have any questions concerning a claim of confidentiality, please contace Linda Barajas at (415) 744-1244.

If you should have any question concerning the review of your application, please contact Mark Sims of my staff at (415) 744-1261.

Sincerely,

Matt Haber
Chief, New Source Section
Air and Toxics Division

Attachment

cc: Guam EPA
R.W. Beck & Associates

ATTACHMENT

INSTRUCTIONS FOR CLAIMING CONFIDENTIALITY

A. Pursuant to 40 CFR 2.204(e), your claim must address these points:

i. The portions of the information alleged to be entitled to confidential treatment;

ii. The period of time for which confidential treatment is desired by the business (e.g., until the occurrence of a specific event, or permanently);

iii. The purpose for which the information was furnished to EPA and the appropriate date of submission, if known;

iv. Whether a business confidentiality claim accompanied the information when it was received by EPA;

v. Measures taken by you to guard against the undesired disclosure of the information to others;

vi. The extent to which the information has been disclosed to others and the precautions taken in connection therewith;

vii. Pertinent confidentiality determinations, if any, by EPA or other Federal agencies, and a copy of any such determination or reference to it, if available;

viii. Whether you assert that disclosure of this information would be likely to result in substantial harmful effects on your business's competitive position, and if so, what those harmful effects would be, why they should be viewed as substantial; and an explanation of the casual relationship between disclosure and such harmful effect, and

ix. Whether you assert that the information is voluntarily submitted information and if so, whether any disclosure of the information would tend to lessen the availability to EPA of similar information in the future. "Voluntarily submitted information" is defined in 40 CFR Section 2.201(i) as business information in EPA's possession:

a). The submission of which EPA has no statutory or contractual authority to require; and

b). The submission of which was not prescibed by statute or regulation as a condition of obtaining some benefit (or avoiding some disadvantage) under a regulatory program of general applicability, including such regulatory programs as permit, licensing, registration, or certification programs, but excluding programs concerned solely or primarily with the award or administration by EPA of contracts or grants.

B. We will disclose information covered by your claim only to the extent provided for in 40 CFR Part 2, Subpart B, Confidentiality of Business Information. Please address your claim and substantiation of confidentially to Linda Barajas (A-5-1), EPA, Region 9, 75 Hawthorne Street, San Francisco, CA 94105.

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, Ca. 94105-3901

July 1, 1992

In Reply: A-5-1
Refer To: NSR 4-11
GU 92-01

Mr. John Benavente
General Manager
Guam Power Authority
P.O. Box 2977
Agana, Guam, U.S.A. 96910-2977

Dear Mr Benavente:

This letter is to acknowledge receipt of your application dated June 5, 1992, and received by this office on June 8, 1992, for an Environmental Protection Agency Prevention of Significant Deterioration Approval to Construct (PSD) Permit. The application is for Combustion Turbines #1 and #2 at the Dededo Generating Station located in Dededo, Guam.

Your application and all supporting information is currently being reviewed by this office. You will be notified if additional information is needed in order to continue the processing of the application.

Guam EPA is being notified of our receipt of this application by copy of this letter. You should consult with them concerning their permitting requirements.

If you have any questions concerning the review of your application, please contact Mark Sims of my staff at (415) 744-1261.

Sincerely,

Matt Haber
Chief, New Source Section
Air and Toxics Division

cc: Guam EPA
R.W. Beck & Associates

GPA Dededo BACT Analysis
(NSR 4-11, GU 92-01)
January 26, 1993

## I. Applicant

Guam Power Authority
P.O. Box 2977
Agana, Guam 96910

## II. Project Description

The existing diesel generator portion of the facility consists of four (4) 2.5-MW diesel generators, two (2) 40,000 gallon fuel storage tanks, and electrical facilities for voltage step-up and power control.

The proposed project consists of the following equipment: two (2) 23-MW combustion turbines fired with #2 fuel oil, two (2) 150,000 gallon fuel storage tanks, a water demineralizer, two (2) 15,000 gallon demineralized water storage tanks, a 100,000 gallon raw water (potable) storage tank, a 1-MW diesel generator for black starts, and electric facilities to transmit power out from the station for distribution.

No additional growth (and associated increase in emissions) is expected to occur because of this proposed project. In fact, rapid growth on Guam has made this project necessary. The 46-MW of power generated by the two combustion turbines will offset power that otherwise would be generated by private or emergency diesel generating units.

## III. Emissions from the Proposed Project

There are three (3) identified sources of pollutant emissions from the proposed espansion of the Dededo facility: the two 23-MW combustion turbines and the 1-MW black start standby diesel generator.

Detailed emission rates, based upon annual emission rate calculations done by GPA in the permit application, are presented in the Air Quality Report, Table 1. Included are emissions from the proposed new units, emissions from the existing diesel units, and combined Dededo facility emissions after completion of the proposed project. GPA calculated these emission rates using both equipment vendor-supplied emissions data and the EPA Compilation of Air Pollutant Emission Factors (AP-42; EPA, 1985).

## IV. Best Available Control Technology (BACT)

The PSD regulations require that a determination of BACT be made for each pollutant subject to major source review. BACT is defined as "...an emission limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Act...which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable for such source...."

### A. Nitrogen Oxides ($NO_X$)

The proposed emission units are Nuovo Pignone/General Electric Frame 5 23-MW simple-cycle combustion turbines. $NO_X$ formation occurs by two mechanisms: (1) thermal oxidation of nitrogen in combustion air, and (2) oxidation of fuel-bound nitrogen. Combustion control techniques can be used to reduce the formation of thermal $NO_X$, while post combustion techniques remove $NO_X$ from the exhaust gas stream. The applicant reviewed the following $NO_X$ reduction technologies:

1. Dry Low-$NO_X$ Burners
2. Steam Injection
3. Selective Catalytic Reduction (SCR)
4. Water Injection

The applicant proposes water injection as BACT for this project. The applicant based this determination on several factors:

1. Dry low-$NO_X$ burners have primarily been used in natural gas-fired turbines. However, dry low-$NO_X$ burners have not obtained $NO_X$ emissions lower than conventional burners when firing distillate fuel oil. Therefore, dry low-$NO_X$ burners were not evaluated further in the BACT analysis.

2. The applicant did not consider steam injection as BACT because steam is not available for use at the facility.

3. SCR, while potentially producing the lowest $NO_X$ emissions of the reduction techniques studied, presented several technical difficulties in this

application. Combined-cycle turbines with HRSGs (Heat Recovery Steam Generators) readily allow for a stable operating exhaust gas temperature range for catalyst operation. Simple-cycle combustion turbine exhaust gases may vary more in temperature (especially when the turbine is used for peak-load operation) and have a higher temperature range than combined-cycle turbine exhaust gases. Variations in exhaust gas temperature may result lower $NO_x$ reduction and greater chance of ammonia slip. High exhaust gas temperatures may also result in catalyst damage.

Distillate fuel oil firing presents a problem to SCR systems in that sulfur contained in the oil may poison the catalyst. Thus, the catalyst may have to be changed much more often than for SCR systems where natural gas is fired.

For these reasons, the applicant rejected SCR as BACT.

4. The applicant proposes water injection as BACT and an $NO_x$ emission limit of 59 ppmvd at 15% $O_2$. This BACT proposal is very similar to BACT determinations made for oil-fired simple-cycle combustion turbines found in the Clearinghouse.

EPA has determined that water injection and a $NO_x$ emission limit of 59 ppmvd at 15% $O_2$ and 77.8 lb/hr (full-load operation) represents BACT for the control of $NO_x$ emissions from each combustion turbine.

B. <u>Sulfur Dioxide ($SO_2$)</u>

The applicant proposes restrictions on fuel oil sulfur content as BACT for this project. Post-combustion $SO_2$ controls are not technically feasible for combustion turbines and are not proposed as BACT.

EPA has determined that No. 2 fuel oil containing a maximum sulfur content of 0.6 weight percent represents BACT for this project.

C. Particulate Matter (as $PM_{10}$)

The applicant proposes a $PM_{10}$ emission limit of 19.8 lb/hr as BACT for this project. Post-combustion controls were not considered as BACT.

EPA has determined that a $PM_{10}$ emission limit of 19.8 lb/hr represents BACT for this project.

D. Carbon Monoxide (CO)

The applicant considered the following options as BACT for CO:

1. Oxidation Catalyst
2. Operational Controls

The applicant proposes operational control as BACT for this project. The applicant rejected an oxidation catalyst as BACT for the following reasons:

1. An oxidation catalyst has not been commercially utilized on an oil-fired simple-cycle combustion turbine.

2. An oxidation catalyst increases the reaction of $SO_2$ to $SO_3$, which subsequently combines with water vapor to form sulfuric acid. Equipment corrosion and catalyst deactivation are thus concerns when firing sulfur-bearing fuels.

EPA has determined that BACT for this project is operational controls. Because CO emissions increase significantly at part-load turbine operation, EPA will restrict part-load turbine operation to a maximum of 1000 hours per year. CO emission limits will be set at 14.3 lb/hr at full-load operation and 89.7 lb/hr at part-load operation.

VOC

April 16, 1993

In Reply: A-5-1
Refer To: NSR 4-11
GU 92-01

Mr. John M. Benavente
General Manager
Guam Power Authority
P.O. Box 2977
Agana, Guam, USA 96910-2977

Dear Mr. Benavente:

In accordance with the provisions of the Clean Air Act, 42 U.S.C.A. §§ 7401-7671q. (West Supp. 1992)(the "Act"), the Environmental Protection Agency has reviewed the application submitted by Guam Power Authority (GPA) for two 23-MW oil-fired stationary gas combustion turbines to be located at the Dededo Generating Station.

A request for public comment regarding EPA's proposed action on the above application has been published. Enclosed is a copy of EPA's response to significant comments received. After consideration of the expressed views of all interested persons (including local government agencies), and pertinent Federal statutes and regulations, EPA hereby issues the enclosed Approval to Construct/Modify a Stationary Source for the facility described above. This action does not constitute a significant change from the proposed action set forth and offered for public comment.

The Consolidated Permit Regulations (40 CFR Part 124) which were promulgated by the Environmental Protection Agency require that we notify interested parties of the permit issuance and advise them that they may petition the Administrator of the Environmental Protection Agency to review any condition of the permit decision.

CONCURRENCES

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| SYMBOL | A-3-3 | A-5-1 | | | | | |
| SURNAME | Sims | Huber | Biggs | | | | |
| DATE | 16 APR 93 | 4/16/93 | 4/16/93 | | | | |

EPA Form 1320-1 (12-70)

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*U.S.GPO:1988-0-205-471

# AMBIENT AIR QUALITY IMPACT REPORT
# (NSR 4-11, GU 92-01)
# April 16, 1993

## I. Applicant

Guam Power Authority
P.O. Box 2977
Agana, Guam 96910

## II. Project Location

This project is located at the Guam Power Authority (GPA) Dededo Generating Station which currently consists of four (4) 2.5 MW diesel-electric generators, two (2) fuel storage tanks, electrical facilities, and an electrical equipment maintenance facility.

The Dededo facility lies just north of the Marbo Annex of Anderson Air Force Base. Government-owned land leased to Guam Municipal Golf, Inc. lies adjacent to the north of the facility. The Kaiser Subdivision, a residential area, lies to the west and agricultural land lies to the east. The Dededo facility covers approximately 5.25 acres and the new project will be completely contained on the existing facility.

## III. Project Description

The existing diesel generator portion of the facility consists of four (4) 2.5-MW diesel generators, two (2) 40,000 gallon fuel storage tanks, and electrical facilities for voltage step-up and power control.

The proposed project consists of the following equipment: two (2) 23-MW combustion turbines (CTs) fired with #2 fuel oil, two (2) 150,000 gallon fuel storage tanks, a water demineralizer, two (2) 15,000 gallon demineralized water storage tanks, a 100,000 gallon raw water (potable) storage tank, a 1-MW diesel generator for black starts, and electric facilities to transmit power out from the station for distribution.

No additional growth (and associated increase in emissions) is expected to occur because of this proposed project. In fact, rapid growth on Guam has made this project necessary. The 46-MW of power generated by the CTs will offset power that otherwise would be generated by private or emergency diesel generating units.

## IV. Emissions from the Proposed Project

There are three (3) identified sources of pollutant emissions from the proposed expansion of the Dededo facility: the two 23-MW CTs and the 1-MW black start standby diesel generator.

Detailed emission rates, based upon annual emission rate calculations done by GPA in the permit application, are presented in Table 1. Included are emissions from the proposed new units, emissions from the existing diesel units, and combined Dededo facility emissions after completion of the proposed project. GPA calculated these emission rates using both equipment vendor-supplied emissions data and the EPA Compilation of Air Pollutant Emission Factors (AP-42; EPA, 1985).

## V. Applicability of the Prevention of Significant Deterioration (PSD) Regulations

PSD regulations define a "major source" as any source type belonging to a list of 28 source categories which emits or has the "potential to emit" 100 tons per year (tpy) or more of any pollutant regulated under the Clean Air Act (40 CFR §52.21(b)(1)(i)(a)). The PSD regulations define any source type not contained within this list of 28 source categories as a major source if emissions or potential emissions are 250 tpy or more of any pollutant (40 CFR 52.21(b)(1)(i)(b)). Diesel engines and CTs are not on the list of the 28 source categories. Since the maximum potential emissions from the existing diesel engines at Dededo exceed 250 tpy, Dededo is considered a major source. The PSD regulations define "significant net emissions increase" as a net increase in actual emissions which would equal or exceed the significance levels (40 CFR §52.21(b)(23)(i)) for each pollutant subject to regulation.

PSD review is required for a major new or modified source for each pollutant where:

a. The net emissions increase for that pollutant is significant.

b. Pollutant concentrations in the area in which the source is located have not exceeded the applicable NAAQS (attainment area), or if the status of the area is uncertain (unclassified area).

EPA has designated Guam in the area of the Dededo facility as either attainment or unclassified for particulate matter less than 10 microns in diameter ($PM_{10}$), ozone ($O_3$), carbon monoxide (CO), sulfur dioxide ($SO_2$), nitrogen dioxide ($NO_2$), and lead (Pb) (40 CFR §81.353). Therefore, PSD review is required for these pollutants if the proposed project would result in emission increases above the respective significance levels.

The PSD significance levels and the net emissions increases for the proposed project are listed in Table 2. The net emissions increase for this project for lead is below the de minimis level and is therefore not subject to PSD review. PSD review will apply to $PM_{10}$, CO, $SO_2$, $NO_x$, and volatile organic compounds (ozone precursors) expressed as unburned hydrocarbons since the net emission increases for these pollutants are expected to be significant.

PSD review for $PM_{10}$, CO, $SO_2$, $NO_x$, and volatile organic compounds (VOC) will include the application of Best Available Control Technology (BACT); the analysis of ambient air quality impacts; the analysis of air quality and/or visibility impacts on Class I areas; and the analysis of impacts on soils, vegetation, and growth.

## VI. Best Available Control Technology (BACT)

The PSD regulations require that a determination of BACT be made for each pollutant subject to major source review. BACT is defined as "...an emission limitation (including a visible emission standard) based on the maximum degree of reduction of each pollutant subject to regulation under the Act...which the Administrator, on a case-by-case basis, taking into account energy, environmental, and economic impacts, and other costs, determines is achievable for such source...."

### A. Nitrogen Oxides ($NO_x$)

The proposed emission units are Nuovo Pignone/General Electric Frame 5 23-MW simple-cycle combustion turbines. $NO_x$ formation occurs by two mechanisms: (1) thermal oxidation of nitrogen in combustion air, and (2) oxidation of fuel-bound nitrogen. Combustion control techniques can be used to reduce the formation of thermal $NO_x$, while post combustion techniques remove $NO_x$ from the exhaust gas stream. The applicant reviewed the following $NO_x$ reduction technologies:

**Table 1**

**Dededo Generating Station Estimated Emission Rates (tons per year)**

| Pollutant | CTs | Existing Diesels | Combined Emissions |
|---|---|---|---|
| | | | |
| $NO_x$ | 681.6 | 1401.0 | 2082.6 |
| $SO_2$ | 1745.9 | 252.0 | 1997.9 |
| $PM_{10}$ | 173.5 | 140.0 | 313.5 |
| CO | 200.6 | 364.4 | 565.0 |
| VOC | 45.0 | 36.4 | 81.4 |
| | | | |

**Table 2**

**Comparison of Project Emission Rates to PSD Significance Levels (tons per year)**

| Pollutant | CT Emissions | PSD Significance Level |
|---|---|---|
| | | |
| $NO_x$ | 681.6 | 40 |
| $SO_2$ | 1745.9 | 40 |
| $PM_{10}$ | 173.5 | 15 |
| CO | 200.6 | 100 |
| VOC | 45.0 | 40 |
| | | |

1. Dry Low-$NO_x$ Burners
2. Steam Injection
3. Selective Catalytic Reduction (SCR)
4. Water Injection

The applicant proposes water injection as BACT for this project. The applicant based this determination on several factors:

1. Dry low-$NO_x$ burners have primarily been used in natural gas-fired CTs. However, dry low-$NO_x$ burners have not obtained $NO_x$ emissions lower than conventional burners when firing distillate fuel oil. Therefore, dry low-$NO_x$ burners were not evaluated further in the BACT analysis.

2. The applicant did not consider steam injection as BACT because steam is not available for use at the facility.

3. SCR, while potentially producing the lowest $NO_x$ emissions of the reduction techniques studied, presented several technical difficulties in this application. Combined-cycle CTs with HRSGs (Heat Recovery Steam Generators) readily allow for a stable operating exhaust gas temperature range for catalyst operation. Simple-cycle CT exhaust gases may vary more in temperature (especially when the CT is used for peak-load operation) and have a higher temperature range than combined-cycle CT exhaust gases. Variations in exhaust gas temperature may result in lower $NO_x$ reduction and greater chance of ammonia slip. High exhaust gas temperatures may also result in catalyst damage.

   Distillate fuel oil firing presents a problem to SCR systems in that sulfur contained in the oil may poison the catalyst. Thus, the catalyst may have to be changed much more often than for SCR systems where natural gas is fired.

   For these reasons, the applicant rejected SCR as BACT.

   **Note:** Maui Electric Company (MECO) is currently developing an SCR demonstration project for simple and combined-cycle oil-fired CTs (as required by PSD permits HI 90-02, -05). MECO plans to demonstrate the technical feasibility of SCR on oil-fired CTs with this project.

4. The applicant proposes water injection as BACT and an $NO_x$ emission limit of 59 ppmvd at 15% $O_2$. This BACT proposal is very similar to BACT determinations made for oil-fired simple-cycle CTs found in the BACT/LAER Clearinghouse.

   EPA has determined that water injection and a $NO_x$ emission limit of 59 ppmvd at 15% $O_2$ and 83.0 lb/hr (full-load operation) represents BACT for the control of $NO_x$ emissions from each CT.

B. Sulfur Dioxide ($SO_2$)

The applicant proposes restrictions on fuel oil sulfur content as BACT for this project. Post-combustion $SO_2$ controls are not technically feasible for CTs and are not proposed as BACT.

EPA has determined that No. 2 fuel oil containing a maximum sulfur content of 0.6 weight percent represents BACT for this project.

C. Particulate Matter (as $PM_{10}$)

The applicant proposes a $PM_{10}$ emission limit of 19.8 lb/hr as BACT for this project. Post-combustion controls were not considered as BACT.

EPA has determined that a $PM_{10}$ emission limit of 19.8 lb/hr represents BACT for this project.

D. Carbon Monoxide (CO)

The applicant considered the following options as BACT for CO:

1. Oxidation Catalyst
2. Operational Controls

The applicant proposes operational control as BACT for this project. The applicant rejected an oxidation catalyst as BACT for the following reasons:

1. An oxidation catalyst has not been commercially utilized on an oil-fired simple-cycle CT.

2. An oxidation catalyst increases the reaction of $SO_2$ to $SO_3$, which subsequently combines with water vapor to form sulfuric acid. Equipment corrosion and catalyst deactivation are thus concerns when firing sulfur-bearing fuels.

   EPA has determined that BACT for this project is operational controls and a full-load CO emission limit of 25 ppmvd. Because CO emissions increase significantly at part-load CT operation, EPA will restrict part-load CT operation to a maximum of 1000 hours per year. CO emission limits will be set at 21.0 lb/hr at full-load operation and 86.0 lb/hr at part-load operation.

E. Volatile Organic Compounds (VOCs)

   Catalytic oxidation and operational controls are the two control technologies used to control VOC (unburned hydrocarbon) emissions. EPA has determined that BACT for this project is operational controls.

## VII. Air Quality Impacts

The PSD regulations require an air quality analysis to determine the impacts of the proposed project on ambient air quality. For all regulated pollutants emitted in significant quantities, the analysis must consider whether the proposed expansion will cause a violation of (1) the applicable PSD increments, and (2) National Ambient Air Quality Standards (NAAQS). A discussion on the general approach, air quality model selection, significant impact levels, PSD increment consumption, and compliance with ambient air quality standards, are presented below. The proposed expansion will be located in a PSD Class II area. Guam does not contain any Class I areas.

A. General Approach

Air quality modeling was used to determine the ambient impacts of the proposed project. Both simple and complex terrain screening level models, and a refined simple terrain model were used.

The maximum project impacts were projected to occur at several discrete areas to the south of the facility and one area to the north. The distance to the point to maximum impact was 1.9 km. A fine receptor grid of 500 m. by 500 m. and a resolution of 100 m. was used for the refined analysis in the areas where a significant impact was predicted.

Modeled impacts were below the monitoring de minimis level for all pollutants; therefore no ambient air quality monitoring was required. Ambient air quality data for $SO_2$ was not available for the refined analysis and no background values were included in the analysis.

B. Air Quality Model Selection

The air quality analysis consisted of a screening analysis using the Industrial Source Complex Short-Term (ISCST) with screening meteorology for simple terrain and the Complex1 (Valley option) model for complex terrain. Refined analysis for the simple terrain was performed using ISCST with five years of off-site meteorological data collected at the Naval Air Station. The modeling analysis used regulatory default options and no modifications were made to the models.

The meteorological data used as model input consists of surface and upper air data collected at the National Weather Service (NWS) station located on the western side on the island near the U.S. Naval Communication Station. The NWS station is less than five kilometers from the Dededo site. The data base consists of the five year period from 1967-1971, the most recent readily available five year consecutive period at the time of the analysis.

C. Air Quality Analysis

The air quality analysis demonstrated that the CTs will not cause or significantly contribute to a violation of the NAAQS or the PSD increment. The concentrations were compared with the PSD increments in the table shown below. The screening analysis indicated that the modeled contribution of particulate matter, $NO_2$, CO and annual $SO_2$ were predicted to be below the modeling significance levels. The screening analysis also indicated that the 3-hour and 24-hour $SO_2$ impacts were predicted to be above the modeling significance level. Refined analysis indicated that the predicted $SO_2$ levels for the areas of significant impact were below the applicable NAAQS and PSD increments.

The following shows the maximum degree of increment consumption that is expected from the proposed project.

| POLLUTANT | PSD CLASS II INCREMENT ($ug/m^3$) | PROJECTED IMPACT ON INCREMENT ($ug/m^3$) |
|---|---|---|
| $SO_2$ | | |
| annual | 20 | 0.6 |
| 24-hour | 91 | 9.3 |
| 3-hour | 512 | 26.2 |
| $NO_2$ | | |
| annual | 25 | 0.2 |
| TSP | | |
| annual | 19 | 0.6 |
| 24-hour | 37 | 2.3 |

## VIII. Additional Impact Analysis

### A. Visibility

The PSD regulations require that PSD permit applicants address the potential impairment to visibility in Class I areas. Since Guam does not contain any Class I areas or identified scenic vistas, a visibility analysis is not required.

### B. Soils and Vegetation

Since the Dededo facility site has been previously cleared, graded, and filled with compacted coral limestone, only small amounts of vegetation remain at the site. The proposed project will be constructed entirely in the previously developed site area. The area vegetation comprises a well developed limestone forest. The dominant vegetation includes seeded breadfruit, banyan, and foxtail grass. The subdominant group includes screw pine, ederico palm, and tangantangan. Agricultural land is adjacent to the facility on the east. The NAAQS were established to protect the environment and typically, ambient concentrations of pollutants below the NAAQS will not have a significant detrimental effect on vegetation. However, certain sensitive vegetative species, such as soybeans and alfalfa, may be affected by long-term exposure to low concentrations of criteria or non-criteria pollutants.

Emissions from the proposed project are well below the NAAQS and only consume a small portion of the PSD increment for all criteria pollutants. In addition, EPA does not anticipate emissions of non-criteria pollutants from the proposed project to be significant. Emissions should therefore have no significant detrimental effect on area soils or vegetation.

## IX. Endangered Species Act

Pursuant to Section 7 of the Endangered Species Act, EPA is required to initiate consultation with the Fish and Wildlife Service (FWS) if any action, including permit issuance, might jeopardize the continued existence of endangered or threatened species or adversely modify their critical habitat.

EPA asked the FWS Pacific Island Office in Honolulu, Hawaii, for a listing of any endangered species which may be affected by this project. FWS stated that no endangered species will be affected by the project.

## X. Conclusions and Proposed Action

Based upon the information supplied by the applicant, GPA, and our review of the analyses contained in the permit application, EPA makes the preliminary determination that the proposed project will employ Best Available Control Technology and will not cause or contribute to a violation of the NAAQS and PSD increment for $PM_{10}$, CO, $SO_2$, or $NO_2$. Therefore, EPA intends to issue a PSD permit for the proposed project, subject to the following conditions.